

Space Weather Forecast

Issued on Thursday, 04 July 2024 at 13:07 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

Space Weather Forecast Headline: Chance of Moderate-class X-ray flares throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity was Low, with occasional low-level Common-class activity from several well-spread active region sources.

There are currently eight sunspot regions on the facing side, and perhaps signs of an arriving ninth over the southwestern limb in extreme UV. Perhaps foremost amongst the current regions has been one in the northwest, with its overall size increasing in the 24 hours.

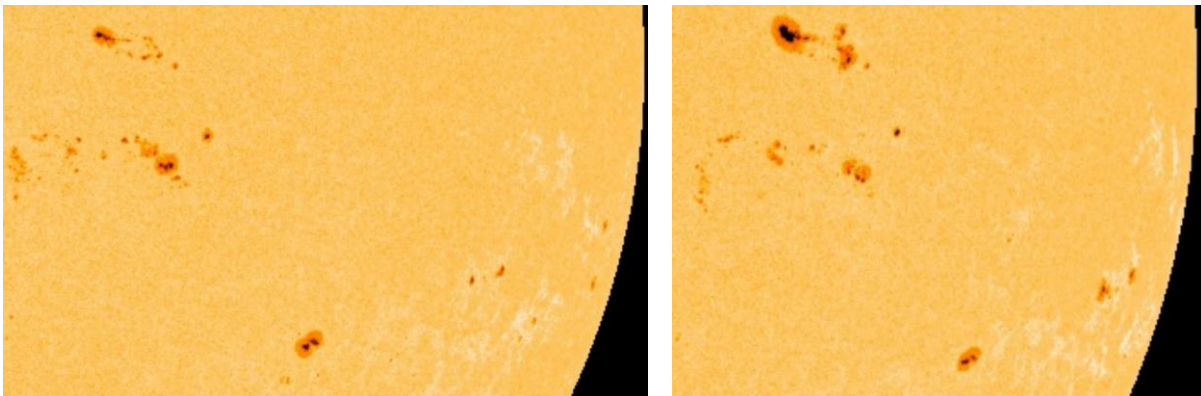


Figure 1: 24-hour change in visible satellite imagery to 04/1030UTC showing the southwestern portion of the Sun. Most notably amongst these regions is the areal growth of the northernmost, but also perhaps the slight simplification of the group spanning many degrees of solar longitude immediately below this (centre-left of both images).

A narrow, southwest-directed CME was seen into the start of this 24-hour period leaving a sunspot in the southwest, followed around 03/1500UTC by a far-sided emission also heading southwest. Neither is expected to affect Earth. A 'filament eruption' was detected in near-infrared imagery at 04/0700UTC from the central-west of the Sun, and perhaps another at 04/0945UTC. There is no confirmatory satellite imagery available at the time of writing as to whether these left the immediate solar environment or not - this will be monitored in the coming hours. No Earth-directed Coronal Mass Ejections (CMEs) have been observed in imagery during the past 24 hours.

Solar Wind / Geomagnetic Activity: Solar winds were at background, but with a discontinuity of uncertain provenance seen at 03/1550UTC. This event did not neatly fit any mechanism, but may perhaps have been interaction with the edge of the shock from the 29 June CME, but this is a very tentative diagnosis, and it was in any case not impactful in terms of geomagnetism.

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Solar wind speeds showed a rise and fall within background levels as a result, with the number of particles in the solar wind again within usual background levels. The associated magnetic field peaked at slightly elevated levels but was mainly lower, including on passage of any CME.

The net result of the above solar wind measures was for quiet geomagnetic indices.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: There is a flat daily chance of further isolated Moderate-class flares, perhaps most likely from the growing sunspot mentioned in the Solar Activity section. Upcoming sunspot region arrivals over the eastern solar horizon in the period should help compensate for western horizon losses.

Solar Wind / Geomagnetic Activity: The 29 June southwest filament CME has now most likely missed Earth to (minimal or) no effect. No further CMEs feature in the forecast.

The sole fast wind due in the period may feature over the coming UTC weekend, however this is not expected to be particularly marked and will probably peak below Minor Geomagnetic storm G1, with the forecast otherwise quiet.

Energetic Particles / Solar Radiation: No solar radiation storms are expected, with a daily Slight Chance of Minor Solar Radiation Storm S1 or greater given the presence of several regions near the (better-connecting) western solar horizon.

Geomagnetic Storms:

Geo-Magnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	No	1	1	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	No	30	30	30	30
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm ⁻² sr ⁻¹ s ⁻¹)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = cm⁻²sr⁻¹s⁻¹)